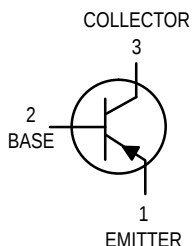
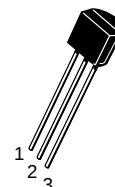


Amplifier Transistors

PNP Silicon



BC212,B
BC213
BC214



CASE 29-04, STYLE 17
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	BC 212	BC 213	BC 214	Unit
Collector–Emitter Voltage	V_{CEO}	–50	–30	–30	Vdc
Collector–Base Voltage	V_{CBO}	–60	–45	–45	Vdc
Emitter–Base Voltage	V_{EBO}	–5.0			Vdc
Collector Current — Continuous	I_C	–100			mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8			mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0			Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150			°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	357	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	125	°C/W

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage ($I_C = -2.0 \text{ mAdc}$, $I_E = 0$)	BC212	$V_{(BR)CEO}$	–50	—	—	Vdc
	BC213		–30	—	—	
	BC214		–30	—	—	
Collector–Base Breakdown Voltage ($I_C = -10 \mu\text{A}$, $I_E = 0$)	BC212	$V_{(BR)CBO}$	–60	—	—	Vdc
	BC213		–45	—	—	
	BC214		–45	—	—	
Emitter–Base Breakdown Voltage ($I_E = -10 \mu\text{Adc}$, $I_C = 0$)	BC212	$V_{(BR)EBO}$	–5	—	—	Vdc
	BC213		–5	—	—	
	BC214		–5	—	—	
Collector–Emitter Leakage Current ($V_{CB} = -30 \text{ V}$)	BC212	I_{CBO}	—	—	–15	nAdc
	BC213		—	—	–15	
	BC214		—	—	–15	
Emitter–Base Leakage Current ($V_{EB} = -4.0 \text{ V}$, $I_C = 0$)	BC212	I_{EBO}	—	—	–15	nAdc
	BC213		—	—	–15	
	BC214		—	—	–15	

BC212,B BC213 BC214**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = -10\ \mu\text{Adc}$, $V_{CE} = -5.0\ \text{Vdc}$)	h_{FE}	BC212 40	—	—	—
		BC213 40	—	—	
		BC214 100	—	—	
($I_C = -2.0\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$)		BC212 60	—	—	
		BC213 80	—	—	
		BC214 140	—	600	
($I_C = -100\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$)(1)		BC212, BC214 —	120	—	
		BC213 —	140	—	
Collector–Emitter Saturation Voltage ($I_C = -10\ \text{mAdc}$, $I_B = -0.5\ \text{mAdc}$)	$V_{CE(sat)}$	—	–0.10	—	Vdc
($I_C = -100\ \text{mAdc}$, $I_B = -5.0\ \text{mAdc}$)(1)		—	–0.25	–0.6	
Base–Emitter Saturation Voltage ($I_C = -100\ \text{mAdc}$, $I_B = -5.0\ \text{mAdc}$)	$V_{BE(sat)}$	—	–1.0	–1.4	Vdc
Base–Emitter On Voltage ($I_C = -2.0\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$)	$V_{BE(on)}$	–0.6	–0.62	–0.72	Vdc
DYNAMIC CHARACTERISTICS					
Current–Gain — Bandwidth Product ($I_C = -10\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$)	f_T	BC212 —	280	—	MHz
		BC214 —	320	—	
		BC213 —	360	—	
Common–Base Output Capacitance ($V_{CB} = -10\ \text{Vdc}$, $I_C = 0$, $f = 1.0\ \text{MHz}$)	C_{ob}	—	—	6.0	pF
Noise Figure ($I_C = -0.2\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$, $R_S = 2.0\ \text{k}\Omega$, $f = 1.0\ \text{kHz}$)	NF	BC214 —	—	2	dB
($I_C = -0.2\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$, $R_S = 2.0\ \text{k}\Omega$, $f = 1.0\ \text{kHz}$, $f = 200\ \text{Hz}$)		BC212, BC213 —	—	10	
Small–Signal Current Gain ($I_C = -2.0\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{fe}	BC212 60	—	—	—
		BC213 80	—	—	
		BC214 140	—	—	
		BC212B 200	—	400	

1. Pulse Test: T_p 300 s, Duty Cycle 2.0%.

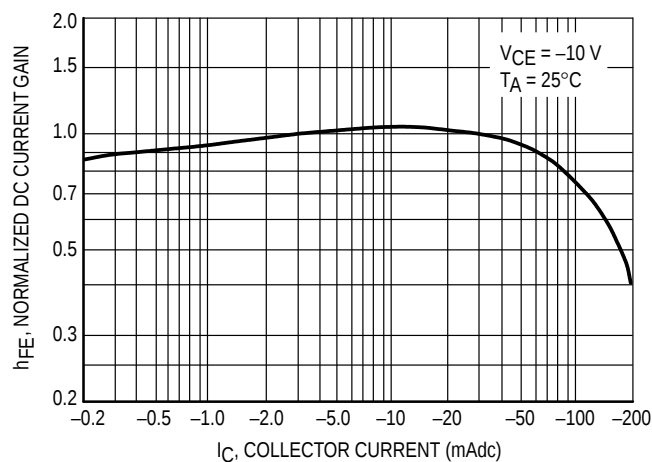


Figure 1. Normalized DC Current Gain

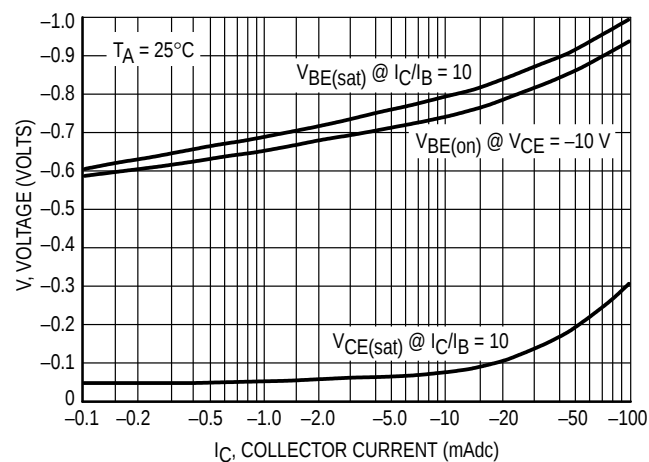


Figure 2. "Saturation" and "On" Voltages

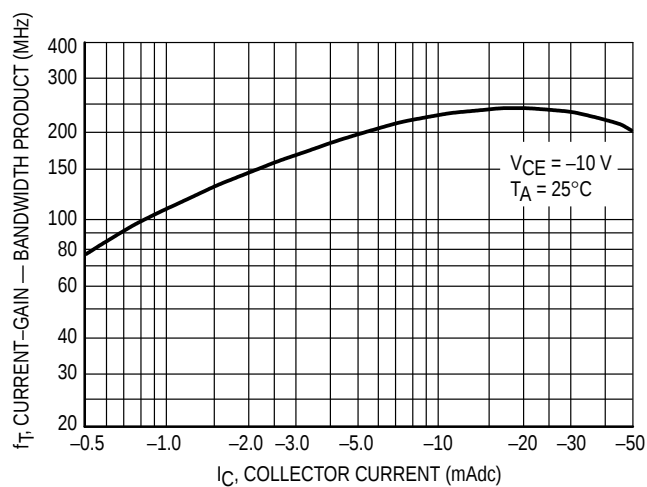


Figure 3. Current-Gain — Bandwidth Product

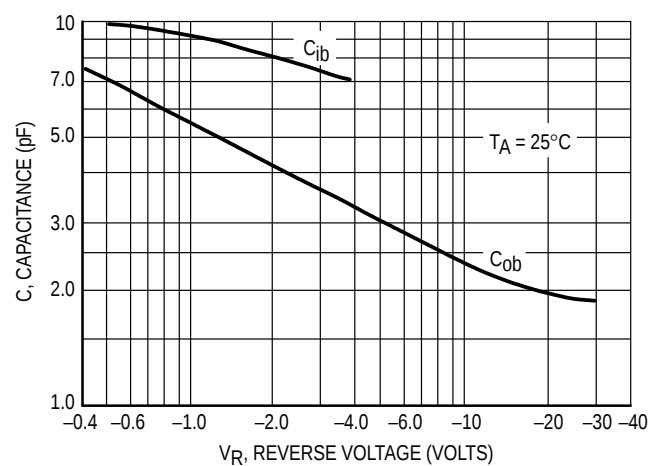


Figure 4. Capacitances

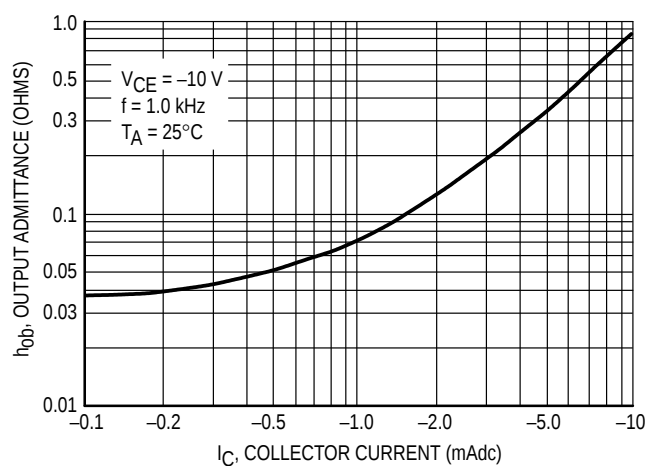


Figure 5. Output Admittance

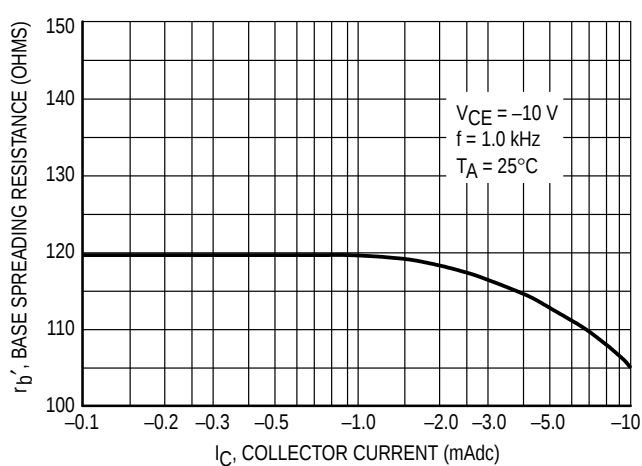
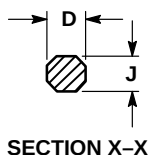
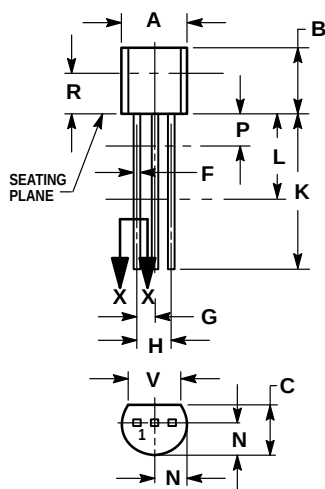


Figure 6. Base Spreading Resistance

PACKAGE DIMENSIONS



**CASE 029-04
(TO-226AA)
ISSUE AD**

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	—	12.70	—
L	0.250	—	6.35	—
N	0.080	0.105	2.04	2.66
P	—	0.100	—	2.54
R	0.115	—	2.93	—
V	0.135	—	3.43	—

STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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